WE CLAIM:

1. A method for accommodating interaction phenomenon in a data-flow-based simulation of a system of elements, the method comprising:

establishing a plurality of meta-modules, each of the plurality of meta-modules simulating an element in the system of elements; and

establishing one or more world modules associated with respective ones of one or more interaction phenomenon such that each of the one or more world modules is associated with a proxy module from each meta-module of a group of the plurality of meta-modules, the group being associated with one of the one or more interaction phenomenon, the proxy module from each meta-module of the group forming a grouping of proxy modules.

2. The method according to claim 1, wherein the one or more world modules includes one or more of a communication world, a sensor world, a mobility world, and a contact world.

3. The method according to claim 1, wherein one or more of the one or more world modules is associated with another one or more of the one or more world modules.

4. The method according to claim 1, further comprising the step of simulating one of the one or more interaction phenomenon in a corresponding one of the one or more world modules by accessing one or more member functions in the grouping of proxy modules.

5. The method according to claim 1, further comprising the step of dynamically allocating the proxy module at a desired point in the simulation of the

system of elements so as to accommodate the addition of an element in the system of elements being simulated.

6. The method of claim 5, further comprising the step of dynamically generating the proxy module by the one or more world modules.

7. The method of claim 5, wherein the step of dynamically allocating is performed during execution without re-compiling.

8. The method according to claim 1, further comprising the step of dynamically de-allocating the proxy module at a desired point in the simulation of the system of elements so as to accommodate the deletion of an element in the system of elements being simulated.

9. The method of claim 8, wherein the step of dynamically de-allocating is performed during execution without re-compiling.

10. The method of claim 1, wherein the system of elements includes one or more of: a system of embodied agents, a system of robots, a system of mobile communication terminals, and a system of vehicles.

11. The method of claim 1, further comprising the step of the one or more world modules dynamically allocating one or more ports to the proxy module.

12. The method of claim 1, further comprising the step of updating the proxy module by the one or more world modules.

13. An apparatus for accommodating interaction phenomenon in a data-flow-based simulation of a system of elements, the apparatus comprising:

a memory; and

a processor coupled to the memory, the memory for storing instructions for causing the processor to:

establish a plurality of meta-modules, each of the plurality of meta-modules simulating an element in the system of elements; and

establish one or more world modules associated with respective ones of one or more interaction phenomenon such that each of the one or more world modules is associated with a proxy module from each meta-module of a group of the plurality of meta-modules, the group being associated with one of the one or more interaction phenomenon, the proxy module from each meta-module of the group forming a grouping of proxy modules.

14. The apparatus according to claim 13, wherein the one or more world modules includes one or more of a communication world, a sensor world, a mobility world, and a contact world.

15. The apparatus according to claim 13, wherein one or more of the one or more world modules is associated with another one or more of the one or more world modules.

16. The apparatus according to claim 13, wherein the instructions further cause the processor to simulate one of the one or more interaction phenomenon in a corresponding one of the one or more world modules by accessing one or more member functions in the grouping of proxy modules.

17. The apparatus according to claim 13, wherein the instructions further cause the processor to dynamically allocate the proxy module at a desired point in the simulation of the system of elements so as to accommodate the addition of an element in the system of elements being simulated.

18. The apparatus according to claim 17, wherein the instructions further cause the processor to perform dynamic generation of the proxy module using the one or more world modules.

19. The apparatus according to claim 17, wherein, in dynamically allocating, the instructions further cause the processor to perform dynamic allocation during execution without re-compiling.

20. The apparatus according to claim 13, wherein the instructions further cause the processor to dynamically de-allocate the proxy module at a desired point in the simulation of the system of elements so as to accommodate the deletion of an element in the system of elements being simulated.

21. The apparatus according to claim 13, wherein the system of elements includes one or more of: a system of embodied agents, a system of robots, a system of mobile communication terminals, and a system of vehicles.

22. The apparatus according to claim 13, wherein the instructions further cause the processor to dynamically allocate one or more ports to the proxy module from the one or more world modules.

23. The apparatus according to claim 13, wherein the instructions further cause the processor to update the proxy module by the one or more world modules.

24. A method for accommodating one or more interaction phenomenon in a data-flow-based simulation of a system of elements, the data-flow-based simulation involving a plurality of modules, the method comprising:

simulating each element in the system of elements with a meta-module;

establishing a world module for each of the one or more interaction phenomenon;

associating each element in the system of elements with one or more modules in the plurality of modules;

establishing an association between the world module and a proxy module associated with each of one or more elements of the system of elements which have an association with the interaction phenomenon corresponding to the world module; and

dynamically allocating the proxy module during the simulation so as to accommodate the addition of another element in the system of elements.